

CLAIMS

1. Equipment (1) for the detection of detectable surgical products, in particular for the detection of electronically detectable elements (EDE), of the type which use
5 a scanning unit (3) and a control unit (4), said scanning unit comprising electromagnetic radiation emitting means (15) and electromagnetic radiation receiving means (16) of the electromagnetic radiation produced by the metal alloy of the surgical product, said scanning unit functioning by means of a computer program incorporated in the control unit which processes the morphology and
10 harmonics of the electromagnetic radiation received by the receiving means to detect the presence of surgical products in the human body, **characterized in that** the fundamental frequency of the electromagnetic radiation emitted by the emitting means is between 50 and 300 Hz, and in that the harmonics of the electromagnetic radiation received by the receiving means are, in a first range,
15 between 5 and 22 times the fundamental radiation frequency emitted; a second harmonics range of between 30 and 34 times the fundamental radiation frequency emitted; and a third harmonics range of between 40 and 45 times the fundamental radiation frequency emitted, and in that the equipment is provided with an indicator device (5) provided with 3 indicators, respectively, the indicator (5a) which is
20 activated when electromagnetic radiation with a morphology corresponding to the metal alloy of the electronically detectable element is detected; an indicator (5b) which is activated when a reading occurs with a harmonics content characteristic of the metal alloy of the electronically detectable element; and an indicator (5c) which is activated when the equipment is saturated or the detection is outside the dynamic range of the equipment, said indicators (5a), (5b) and (5c) being able to
25 be activated according to the characteristics of the electromagnetic radiation received.
2. Equipment (1) for the detection of detectable surgical products, according
30 to claim 1, characterized in that the control unit (4) comprises a conditioning device (6) of the signal which comes from the receiving means, an analysis device (7) of said conditioned signal and an electromagnetic radiation emitting device (8).

3. Equipment (1) for the detection of detectable surgical products, according to either claim 1 or 2, characterized in that the conditioning device (6) of the signal which comes from the receiving means comprises:

- 5 a) a conditioner of the electromagnetic radiation received by the receiving means, which eliminates those of the fundamental frequencies, those of the power supply as well as their respective harmonics and frequencies below 2000 Hz;
- 10 b) an emphasis filter which has the function of increasing the intensity of the signals of the three harmonics ranges and which eliminates the frequency signals above 8 kHz;
- c) a low-harmonics channel active filter which permits the passage of frequencies between 5 and 22 times the frequency of the fundamental radiation emitted;
- 15 d) a mid-harmonics channel active filter which permits the passage of frequencies between 30 and 34 times the frequency of the fundamental radiation emitted;
- e) a high-harmonics channel active filter which permits the passage of frequencies between 40 and 45 times the frequency of the fundamental radiation emitted;
- 20 f) a sampler of the third range of harmonics generating a graduated function corresponding to the morphology of the electromagnetic radiation produced by the metal alloys of a surgical product;
- g) a multiplexer which sequentially connects and synchronizes the outputs of the harmonics channel active filter and of the sampler with an analog-digital converter;
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4. Equipment (1) for the detection of detectable surgical products, according to any of claims 1 to 3, characterized in that the analysis device (7) of the conditioned signal comprises:

- 30 h) a microprocessor;
- i) a supply voltage and correct microprocessor functioning controller;
- j) a memory unit to store data which come from the receiving means;
- k) a microprocessor program EPROM memory;

- l) a microprocessor unit to access the different modules it controls;
- m) an analog-digital converter;
- n) a working frequency selector

5 5. Equipment (1) for the detection of detectable surgical products, according
to any of claims 1 to 4, characterized in that the memory unit (j) stores the
electromagnetic identification data of the elements of the environment where the
use of the equipment is planned as well as those generated by the equipment,
whose identification data are obtained by means of a general scanning operation
10 of said environment and are used to recognize the signals which come from said
elements of the environment and of the equipment when the scanning operation is
performed on a patient and, consequently, they can be rejected in the analysis
process with the purpose that they do not interfere in the capturing of other signals
received during the search for foreign bodies inside the patient's body.

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6. Equipment (1) for the detection of detectable surgical products, according
to any of claims 1 to 5, characterized in that the electromagnetic radiation emitting
device (8) comprises:

- o) a low pass filter which blocks frequencies above 300 Hz;
- 20 p) an intensity attenuator of the electromagnetic radiation emitted; and
- q) an amplifier of the electromagnetic radiation emitted;

7. Equipment (1) for the detection of detectable surgical products, according
to any one of the preceding claims, characterized in that the fundamental
25 frequency of the electromagnetic radiation emitted by the emitting means is 72 or
218 Hz.

8. Equipment (1) for the detection of detectable surgical products, according
to any one of the preceding claims, characterized in that the magnetic induction
30 value of the emitting means is below 500 micro-Tesla and is only activated for a
brief instant to avoid interfering with other equipment.

9. Equipment (1) for the detection of detectable surgical products, according

to any one of the preceding claims, characterized in that the detection threshold is very reduced, approximately equivalent to the electromagnetic signal value which produces a mass between 6 milligrams and 10 milligrams, and more preferably between 7 milligrams and 9 milligrams.

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10. Equipment (1) for the detection of detectable surgical products, according to any one of the preceding claims, characterized in that the control unit (4) comprises typical computer components (9), such as: clock, buffer, serial port, internal records, and in that said control unit (4) can be connected to
10 complementary computer components (10): a data processor and/or a printer and/or a screen, used for the computerized processing and/or producing printed and/or visual information of the scan results, whose complementary computer components may be incorporated in the control unit or may be external.

15 11. Equipment (1) for the detection of detectable surgical products, according to any one of the preceding claims, characterized in that, for its operational functioning, the scanning unit (3) and the control unit (4) are interconnected by electronic connection means (11), such as flexible connection cable, optical link, ultrasound link or other suitable ones, so that said means can be disconnected,
20 said scanning unit and control unit remaining separate for the purposes of transport, storage or sterilization operations.